BAB ESHTAR SUBSTATION 11 KV FEEDER CABLE MOSUL, IRAQ

SIGIR PA-06-073
OCTOBER 17, 2006

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SPECIAL INSPECTOR GENERAL FOR IRAQ RECONSTRUCTION

October 17, 2006

MEMORANDUM FOR COMMANDING GENERAL, MULTI-NATIONAL FORCES-IRAQ
DIRECTOR, IRAQ RECONSTRUCTION MANAGEMENT OFFICE
COMMANDING GENERAL, GULF REGION DIVISION-PROJECT AND CONTRACTING OFFICE, U.S. ARMY CORPS OF ENGINEERS

SUBJECT: Report on Project Assessment of the Bab Eshtar Substation 11 Kilo Volt (kV) Feeder Cable, Mosul, Iraq (Report Number SIGIR-PA-06-073)

We are providing this project assessment report for your information and use. We assessed the in-process construction work performed on the Bab Eshtar Substation 11 kV Feeder Cable, in Mosul, Iraq to determine the feeder cable's status and whether intended objectives will be achieved. This assessment was made to provide you and other interested parties with real-time information on a relief and reconstruction project in order to enable appropriate action to be taken, if warranted. The assessment team included an engineer and an auditor.

This report does not contain any negative findings. As a result, no recommendations for corrective action were made and further management comments were not requested.

We appreciate the courtesies extended to our staff. This letter does not require a formal response. If you have any questions please contact Mr. Brian Flynn at (703) 604-0969 or brian.flynn@sigir.mil or Mr. Jon Novak at (703) 343-9149 or jon.novak@iraq.centcom.mil.

For public or congressional queries concerning this report, please contact SIGIR Congressional Relations and Public Affairs at publicaffairs@sigir.mil or at (703) 428-1100.

Stuart W. Bowen, Jr.
Inspector General

Special Inspector General for Iraq Reconstruction

SIGIR PA-06-073 **October 17, 2006**

Bab Eshtar Substation 11 kV Feeder Cable
Mosul, Iraq

Synopsis

Introduction. This project assessment was initiated as part of our continuing assessments of selected Electricity Sector reconstruction activities. The overall objectives were to determine whether selected sector reconstruction contractors were complying with the terms of their contracts or task orders, and to evaluate the effectiveness of the monitoring and controls exercised by administrative quality assurance and contract officers. We conducted this project assessment in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included an engineer and an auditor.

Project Assessment Objectives. The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The Contractor's Quality Control (QC) and the United States Government's Quality Assurance (QA) programs were adequate;
4. Project sustainability was addressed; and
5. Project results were consistent with original objectives.

Conclusions. The assessment determined that:

1. The project components were adequately designed prior to construction or installation of the Bab Eshtar Substation (SS) 11 kV Feeder. There exists a detailed Statement of Work (SOW), Bill of Quantities (BOQ), design and set of specifications for the construction the 11 kV feeder network. There was enough detail implemented in the creation, structure and design of the contract (including a subsequent modification) SOW, BOQ, design and set of specifications to build the feeder network. The Ministry of Electricity (MOE) specifications were used to install the feeder cable, which included very detailed installation specifications. Complete and specific details allowed for compliant construction of the Bab Eshtar SS 11 kV Feeder network.

2. Construction work was compliant with the design standards for the Bab Eshtar SS 11 KV Feeder. The contractor's procedure for cable installation was reviewed in each step, using documentation from USACE QA reports and photos, Contractor QC reports and photos, interviews with the USACE Project Engineer (PE) and an on-site visit. At the time of the SIGIR Inspectors' visit, the contractor successfully installed over 9300 meters out of 10000 meters of cable. In addition, the contractor's procedure and cable installation met MOE standards.

3. The contractor's QC and the U.S. Government's QA programs were adequate because the QC/QA systems employed by the contractor and government ensured effective Quality Management during construction. In accordance with requirements, the contractor submitted a timely Quality Control Program effective 16 April 2006 that included a site specific Quality Control Plan, a Health and Safety Plan, and a Security Plan. Based on a discussion with the USACE PE assigned to the project well before construction started on 23 May 2006, security issues and over-all danger in the area required implementation of unique processes to ensure effective QA. Accordingly, Local Nationals (LN) performed on-site QA functions for the project. During the assessment, the inspectors confirmed with the PE that the contractor's reported percent complete was reasonable and supported by the government's QA representative. As a result, project construction when completed will likely be compliant with the terms of the contract.

4. Project sustainability was addressed for the Bab Eshtar SS 11 kV Feeder. The installation of the feeder line consisted of four buried 11 kV feeder cables. The feeders are buried stationary lines and have a high degree of sustainability. Once the feeders have been successfully energized, they will remain in place and carry power to the substation. Therefore, the project is sustainable in the long term.

5. When completed, the project should meet its intended objective to supply, install, test and place in service 12x11kV Underground Cable Feeder to the Bab Eshtar SS in Mosul, Iraq. The desirable outcome will be because project oversight of construction activities by contractor QC and government QA personnel was effective. In addition, the project was adequately planned and designed before construction started on 23 May 2006. As a result, the substation will be able to operate efficiently and improve electricity distribution within the service area.

Recommendations and Management Comments. This report does not contain any negative findings or recommendations for corrective action and management comments were not required. However, U.S. Army Corps of Engineers, Gulf Region Division reviewed the draft and offered no additional information and had no comments.

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Introduction

Objective of the Project Assessment

The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The Contractor's Quality Control (CQC) and the United States Government's Quality Assurance (QA) programs were adequate;
4. Sustainability was addressed; and
5. Project results were consistent with original objectives.

Pre-Site Assessment Background

Contract and Costs

The Bab Eshtar Substation 11 kV Feeder Cable was awarded by Joint Contracting Command-Iraq (JCCI), Project and Contracting Office (PCO)-Electricity Sector and administered by the U.S. Army Corps of Engineers (USACE) Gulf Region Division (GRD) – Northern District (GRN). The contract was awarded as W91GXY-06-C-0023, dated 20 October 2005, a negotiated firm-fixed price, design and construct contract with an initial period of performance ending 15 August 2006.

The contract was awarded to an Iraqi contractor for $674,965. However, the contract was modified once by Modification P00001. The modification effective 4 Aril 2006 changed the route for the feeder cable to meet the requirements of the Ministry of Electricity (MOE). As a result, the contract price increased by $546,035 to $1,221,000. In addition, the contract completion date was extended 100 days from 15 August 2006 to 23 November 2006. In consideration of the modification, the contractor agreed and released the Government from any and all liability under the contract for further equitable adjustments attributable to such facts or circumstances giving rise to the proposal for "Change Request 00001".

Project Objective

Based on contract information and the SOW, design and specifications set forth in the contract, the project objective was to provide a Bab Eshtar12x11kV underground cable feeder system for a new Bab Eshtar 33kV/11kV Substation.

Description of the Facility (pre-construction)

The feeder network consisted of four buried cables distributed for the newly constructed Bab Eshtar 33kV/11kV SS. The Bab Eshtar Substation (SS) is a new addition to the local electrical network. Little or no documentation was available regarding the pre-construction site condition. However, based on the maps provided by the contractor, the contract and the Assessment Team's observation, the pre-construction areas can be determined to be very similar to the post-construction areas

in appearance. Specifically, the cable was placed in an urban area along and across city streets.

Scope of Work of the Contract

The Statement of Work (SOW) laid out the contractor's roles and responsibilities for the entire feeder installation process. The SOW detailed the work, specifications, and testing requirements. The majority of the physical construction of the feeder network was to install the four feeder lines. Based on the contract and the Statement of Work, trenching was defined as the majority of the construction activities. Trenching consisted of excavation, cable installation and backfilling.

Additional cable tests required included voltage drop measurements. Taken from the contract, the maximum allowable voltage drops were:

The maximum allowable voltage drops for various parts of the distribution system shall Be as follows:

Portion of System	%Voltage Drop
Medium Voltage 11 kV Feeder	6-7
Transformer 11kV/230/400V	3
Low Voltage Lines (230V/400V)	5-6
Total	16%

Current Project Design and Specifications

According to the SOW, the entire design, implementation and construction of the electrical feeder network were the contractor's responsibility. Specifically, engineering services, labor, supervision, equipment, drawings including "as built" drawings, tools and miscellaneous materials to supply, install, commission, test and place in service an 11kV underground cable feeder system required completion by the contractor.

According to the SOW, The Ministry of Electricity standards for civil works are to be used. The guidelines include specifications for:

- Cable installation
- Excavation work
- Pre-surveys
- Breaking paved surfaces
- Installation in trench
- Standard installation deviations
- Ducts
- Installation of duct banks
- Back-filling of excavation
- Finishing
- Inspection and testing
- Progress inspections and tests

- Compaction, concrete, and electrical testing
- Interim acceptance inspections and tests

Bill of Quantities

The contract and the subsequent single modification included an updated Bill of Quantities (BOQ). The new BOQ resulted from a substation location change. This precipitated in a new feeder line design at additional costs. Below is the BOQ after modification P00001 was implemented. The yellow highlight designates changes due to the modification.

Item	Unit	QTY	U price	Total in US$
3x150mm2 , 11kv , XLPE insulated cable	M	10,000	43	430000
Straight outdoor heat shrinkable splice kit for 3x150mm2 , 11kv, XLPE cable	Ea	15	325	4875
Indoor Heat shrinkable termination kit for 3x150mm2, 11kv XLPE cable	Ea	9	250	2250
Outdoor Heat shrinkable termination kit for 3x150mm2, 11kv XLPE cable	Ea	5	275	1375
2 Ring-main feeders with cabinet	Ea	2	18000	36000
Excavated sand	m3	550	30	16500
Fine soil	m3	350	50	17500
200mmx400mmx50mmH pre-cast Concrete tiles	Ea	43000	1.25	53750
Warning tape	M	8600	1.5	12900
Soil	m3	550	40	22000
Accessories	Lot			15,000
New price for Materials				**612150**

Work Execution	Unit	New Qty	U price in US$	Total in US$
Survey	Lot			15000
Underground cable 3x150mm2 , 5 feeder trench excavation ,refilling fine soil, laying cable, refilling fine soil and soil, installing warning tape, installing concrete tiles, refilling with excavated sand	M	610	80	48800
Underground cable 3x150mm2 , 3 feeder trench excavation ,refilling fine soil, laying cable, refilling fine soil and soil, installing warning tape, installing concrete tiles, refilling with excavated sand	M	390	70	27300
Underground cable 3x150mm2 , 2 feeder trench excavation ,refilling fine soil, laying cable, refilling fine soil and soil, installing warning tape, installing concrete tiles, refilling with excavated sand	M	2200	60	132000
Underground cable 3x150mm2 , 1 feeder trench excavation ,refilling fine soil, laying cable, refilling fine soil and soil, installing warning tape, installing concrete tiles, refilling with excavated sand	M	1500	50	75000
Straight outdoor heat shrinkable splice kit for 3x150mm2 , 11kv, XLPE cable	Ea	15	150	2250
Indoor Heat shrinkable termination kit for 3x150mm2, 11kv XLPE cable	Ea	9	125	1125
Outdoor Heat shrinkable termination kit for 3x150mm2, 11kv XLPE cable	Ea	5	175	875
Installing of 2 feeders Ring-main with cabinet	Ea	2	3000	6000
Concrete and Asphalt to repair and repaving the surface of roadways and sidewalks and crossing the street to its original state	M	4700	15	70500
All other works	Lot			35000
Total				**413850**
Services				
Site camps requirements and communication	Lot			25000
Transportation of materials	Lot			40000
Stores	Lot			20000
Security				25225
Heavy equipment and Tools	Lot			55000
Total				**165225**
Sub new price				**1195000**
Head Quarter support and management 2.5%				**29775**
Price in US$				**1220775**
Revised Contract Price in US$ (rounded)				**1221000**

BOQ - Yellow depicts P00001 Modification

Upon review of the contract, there existed a detailed SOW, modification, BOQ, design and set of specifications for the construction of the Bab Eshtar SS 11 kV Feeder network. Furthermore, there was enough detail implemented in the creation, structure and design of the contract, modification, SOW, BOQ, and design and set of specifications that compliant construction of the feeder network was very likely. In essence, the contract was complete enough that a comprehensive construction process could be successfully accomplished.

Site Assessment

Work Completed

A visit was attempted on 30 July 2006, but all roads leading to the area with the latest construction activity were blocked. However, the assessment team observed an open trench area at the edge of a city street along the MOE approved route the following day (31 July 2006). For security reasons, the team was not able to stop and take photos. Although the Assessment Team got only a quick observation of an open trench, exposed cable, and tile and warning tape over covered cable, the information correlated with the documentation provided by the Project Engineer.

Overview

The project was to physically install the Bab Eshtar12x11kV underground cable feeder system to the new Bab Eshtar 33kV/11kV Substation. Trenching, installation, backfilling and testing make up the majority of the requirements. Ministry of Electricity standards provided the ground work for the entire process (Map 1).

According to the MOE standards:

1.03 INSTALLATION IN TRENCH
The bottom of the trench shall be prepared level, compacted and free from stones.

Where this condition cannot be met, the trench shall be deepened by an extra 50 mm, which extra depth shall be filled with compacted sand. The standard laying depth (from surface level) of the cables shall be 90 cm for 11 kV 2 100 cm for 33 kV. The trench width shall be sufficient. Where more than one cable is to be installed at the same level, which shall be respect the distance indicated on the enclosed drawings.

1.07 BACK-FILLING OF EXCAVATION
The contractor shall backfill the trench with selected and approved material in the following layers, each layer being well compacted, wanted if necessary, and consolidated, before the next layer is placed.
A layer of 10 cm of approved sand bedding material shall be placed to form smooth bedding for the cables.

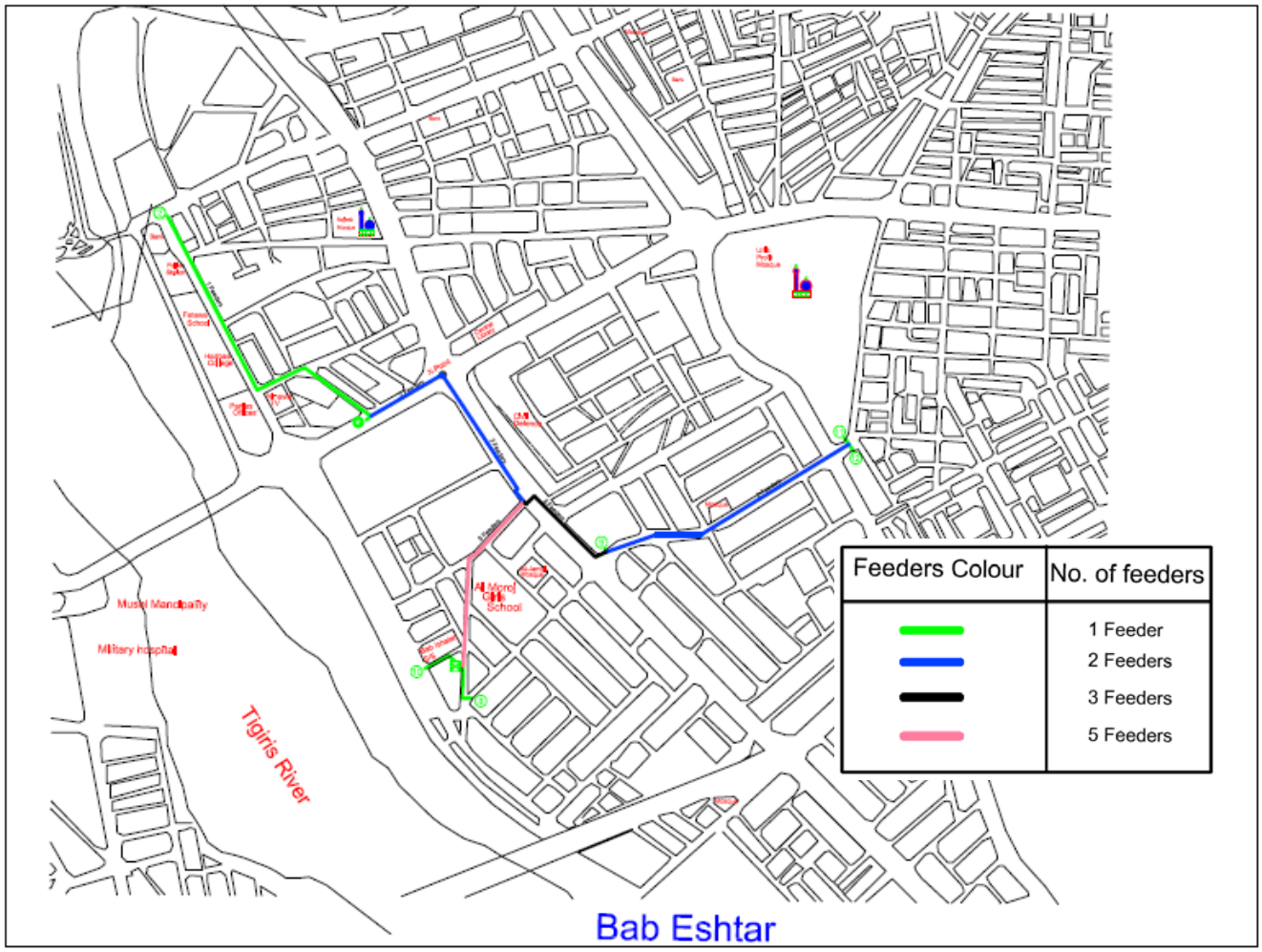
After the cables have been laid, they shall be covered with an additional layer of the approved bedding material and well compacted over and around the cable to a level of 10 cm above the top of the uppermost cable.

After the cables have been laid and until all cable in trench have been protected with cement block (50 x 30 x 5 cm) or plastic protection cover, 2 layers shall be compacted over the plate to a level of 30 cm for both.

1.08 FINISHING (2 Layers)
On the Main and Secondary Road, a layer of 15 cm of concrete a placed before the reinstatement with a layer of 10 cm of asphalt.

On the sidewalk, a layer of 15 cm of road stone is placed, the contractor must reinstate the sidewalk in its original state or with 10 cm of Tarmac.

This work shall comply with the requirements of municipal authority



Map 1. Bab Eshtar SS 11 kV Feeder Map (Provided by USACE)

At the time of the site visit, the inspectors found that construction work had progressed to the final trench (trench one) which was dug to an adequate depth according to MOE standards. There appeared to be adequate sand, concrete and backfill layers in accordance with MOE standards.

Trenching in accordance with the SOW included having all steps/procedures inspected as they occurred by QC or QA personnel. The information and photos below were included in, or attached to, either QC or QA reports retained by the PE.

The cable that was supplied met MOE standards. Specifically, the cable was a XLPE insulated 11 kV 3 X 150 mm^2 cable on 503 meter rolls (Site Photo 1).

Site Photo 1. 503M 3 X 150 mm^2 Electrical Cable (Photo provided by USACE)

After the site location was surveyed, the surface was broken in preparation of trench excavation (Site Photos 2 and 3).

Site Photos 2 and 3. Site preparation and surface material removal (Photo provided by USACE)

The bottom of the trench was compacted and made free from stones, with a standard trench depth of 90 cm according to the MOE standards. The cable was placed in the trench on top of 10 cm of smooth sand to provide a cable bedding material as specified in MOE standards (Site Photos 4 and 5).


Site Photos 4 and 5. The trench is excavated, the base is compacted and the cable is positioned on the sand layer. (Photo provided by contractor)

Cables were spliced together using a shrinkable splice kit for 3x150 mm^2, 11kV, XLPE cable. This kit includes joining components and a shrinkable outer cover that tightened when heat was applied (Site Photos 6 and 7).


Site Photos 6 and 7. Cables spliced together with splice kit. Heat is applied to shrink outer cover. (Photo provided by contractor)

The trenches were backfilled with 10 cm of compacted sand, an approved bedding material, over the cables as specified by MOE standards. In addition, cement block tiles (50 x 30 x 5 cm) were placed over the compacted layer as required (Site Photos 8 and 9).

Site Photos 8 and 9. Cable covered with approved bedding material and application of cement tiles to compacted layer. (Photo provided by USACE)

As the cable installation progressed, the final layers of the trench were backfilled and then compacted to meet MOE standards (Site Photo 10).

Site Photo 10. Compacted backfilled cable trench. (Photo provided by contractor)

On main and secondary roads, a layer of concrete 15 cm thick was placed before being covered with 10 cm of asphalt to finish the roadway. The completed work was then cleaned of debris and work material (Site Photos 11 and 12).


Site Photos 11 and 12. Layer of concrete is placed before being covered with asphalt. Completed cleaned trench surface. (Photo provided by USACE)

In summary, the contractor's procedures and QM processes were reviewed and an on-site visit was conducted. At the time of the SIGIR Inspectors' site visit, the contractor had successfully installed over 9,300 meters out of 10,000 meters of cable. The Assessment Team determined that the construction met MOE standards and the construction was compliant with contract requirements.

Work in Progress

At the time of the site visit, the contractor was not on site and there were no workers present.

Work Pending

At the time of the site visit; the construction remained in the excavation, installation, and back filling stage. The project was divided up into [1]four trenches: trench one, trench two, trench three, and trench five. According to the contractor's 20 July 2006 QC report, 93% of the cable had been installed. Excavation in all trenches was completed except for trench one, which was approximately 53% complete. Accordingly, approximately 700 meters were pending at the time of the site visit.

Project Quality Management

Contractor's Quality Control Program

USACE Engineering Regulation (ER) 1180-1-6, Construction Quality Management, defines Contractor Quality Control (CQC) as the construction contractor's system to manage, control and document his/her own, his/her supplier's, and his/her subcontractor's activities to comply with contract requirements.

[1] The SOW was comprised of four trenches that were uniquely identified on drawings and the BOQ as trench one, trench two, trench three, and trench five. No applicable trench work was referred to as trench four.

In accordance with contract dated 20 October 2005 and minutes for the Pre-Construction Conference conducted on 9 November 2005, the contractor was required to perform Quality Control (QC) functions throughout the duration of design, construction, installation, testing and acceptance. In accordance with requirements, the contractor submitted a timely Quality Control Program effective 16 April 2006 that included a site specific Quality Control Plan (QCP), a Health and Safety Plan, and a Security Plan.

As stated in the contractor's QCP, the company's Quality System Process consisted of controlling the following eight processes:

a. Quality manual;
b. Process section;
c. Contract document review;
d. Document control;
e. Design management;
f. Procurement & expediting;
g. Tool & equipment maintenance, calibration, & testing; and
h. Materials & installed equipment management.

In addition, contract W914GXY-06-C-0023 included a one-year construction warranty in accordance with Federal Acquisition Regulations (FAR) 52.246.21.

Quality Assurance Program

USACE Engineering Regulation (ER) 1180-1-6, Construction Quality Management, defines Quality Assurance (QA) as the system by which the government fulfills its responsibility to be certain the CQC is functioning and the specified end product is realized. Project and Contracting Office (PCO) Standard Operating Procedure (SOP) CN-100, Construction Contractor QC/QA Inspection and Reporting, specifies requirements for an adequate and effective Government QA program. Based on a discussion with the USACE Project Engineer (PE) assigned to the project before construction started 23 May 2006, security issues and overall danger in the area required implementation of unique processes to ensure effective QA. Accordingly, Local Nationals (LN) performed on-site QA functions at the project. For security reasons, the LNs never visited the Mosul Area Office and picked up their pay elsewhere. The PE stated there was no face to face interaction with the LNs who conducted the QA activities on behalf of the USACE.

Quality Management

Engineering Regulation (ER) 1180-1-6 defines Quality Management (QM) as all control and assurance activities instituted to achieve the quality established by the contract requirements. Obtaining quality construction is a combined responsibility of the construction contractor and the government. Their mutual goal must be a quality product conforming to the contract requirements. A cooperative and professional working relationship should be established in order to realize this common goal.

Based on the inspector's review of QC and QA reports, discussions conducted with the Project Engineer, and the Assessment Team's limited observation of the site, the contractor's quality control and the U.S. Government's quality assurance programs were adequate. As a result of the combined efforts of contractor QC and government QA personnel, overall Quality Management practices were effective and when completed the construction will likely meet contract requirements. During the

assessment, the inspector determined that contractor's reported percent completed was reasonable when compared to linear meters installed. While the overall completion for Service Progress reported in the 20 July 2006 QC report was approximately 79 percent, approximately 85 percent of the cable was installed; see Table 1. The USACE Project Engineer agreed that the difference between the QC report and Table 1 calculation was attributed to uncompleted small tasks outside the scope of trenching and cable installation. However, the contractor's reported percent complete was likely accurate or a little conservative. Similarly, the 21 July 2006 QA report estimated the project 85 percent complete.

Description	*Meters Required	**Installed 7-20-2006	Meters to Install	Calculated Percent Complete
Feeder #1	1500	800	700	53%
Feeder #2	2200	2200	0	100%
Feeder #3	390	390	0	100%
Feeder #5	610	610	0	100%
Overall Total	**4700**	**4000**	**700**	**85%**

Table 1
* Mod P00001 General Description Attachment 2
** QC Report Dated 20 July 2006

In addition, the assessment team found the photos included in both QC and QA reports descriptive and an effective supplement to the written reports. For example, a photo attached to the QC report dated 22 June 2006 shows that the buried cable was covered with concrete tile and warning tape as required by the SOW. A photo attached to the 1 July 2006 QA report was used to verify that materials complied with requirements. As such, the USACE PE stated that he was confident in the general reliability of the QC/QA systems employed to ensure effective QM and a good end product (Site Photos 13 and 14).

Site Photo 13. Buried cable covered with tile and warning tape.

Site Photo 14. Inventory tag documents cable size and voltage rating.

Project Sustainability

The SIGIR engineer reviewed and evaluated sustainability coverage under the current contract for Bab Eshtar SS 11 kV Feeder Cable. The project consisted of providing four buried 11 kV feeder cables to the new Bab Eshtar substation.

In that the feeders are buried stationary cables, they offer a high degree of sustainability. Once the feeders have been successfully energized, they were designed to remain in place to carry power to the substation for many years to come.

Conclusions

We reached the following conclusions for the assessment objectives 1, 2, 3, 4, and 5. Appendix A provides details pertaining to Scope and Methodology and limitations of this project assessment.

1. Determine whether project components were adequately designed prior to construction or installation.

   The project components were adequately designed prior to construction or installation of the Bab Eshtar SS 11 kV Feeder Cable. There existed a detailed SOW, BOQ, design and set of specifications for the construction of the Bab Eshtar SS 11 kV Feeder Cable network. There was enough detail implemented in

the creation, structure and design of the contract, modification P00001, the SOW and BOQ, design and set of specifications that construction of the feeder network was buildable. The MOE specifications were used to install the feeder cable, which included very detailed specifics on installation. These complete and specific details allowed for the complete construction of the Bab Eshtar SS 11 kV Feeder Cable project.

2. Determine whether construction met the standards of the design.

   Construction work was compliant with the design standards for the Bab Eshtar SS 11 kV Feeder. The contractor's procedure for cable installation ensured that a compliant project was built. This was confirmed by review of the QM process and discussions with the PE. At the time of the SIGIR Inspectors' site visit, the contractor had successfully installed over 9300 meters out of 10000 meters of cable. The contractor's procedure and installation of the cable met with MOE standards and contract terms.

3. Determine whether the Contractor's Quality Control and the Government Quality Assurance programs were adequate.

   The contractor's quality control and the U.S. Government's quality assurance programs were adequate because the QC/QA systems employed by the contractor and government ensured effective Quality Management during construction. In accordance with requirements, the contractor submitted a timely Quality Control Program effective 16 April 2006 that included a site specific Quality Control Plan (QCP), a Health and Safety Plan, and a Security Plan. Based on a discussion with the USACE PE assigned to the project before construction started 23 May 2006, security issues and over all danger in the area required implementation of unique processes to ensure effective QA. Accordingly, Local Nationals (LN) performed on-site QA functions the project projects. During the assessment, the inspector confirmed that contractor's reported percent completed was reasonable and supported by the government's QA representative.

4. Determine if project sustainability was addressed.

   Project sustainability was addressed for the Bab Eshtar SS 11 kV Feeder. The installation consisted of four buried 11 kV feeder cables. The feeders are stationary lines and have a high degree of sustainability. Once the feeders have been successfully energized, they were designed to remain in place to carry power to the substation for many years. Therefore, this project is sustainable.

5. Determine whether project results were consistent with original objectives.

   When completed, the project should meet its intended objective to supply, install, test and place in service 12x11kV Underground Cable Feeder to the Bab Eshtar substation in Mosul, Iraq. The desirable out come will be because project oversight of construction activities by contractor Quality Control and government Quality Assurance personnel was effective. In addition, the project was adequately planned and designed before construction started on 23 May 2006. As a result, the substation will be able to operate efficiently and improve electricity distribution within the service area.

Recommendations and Management Comments

This report does not contain any negative findings or recommendations for corrective action and management comments were not required. However, U.S. Army Corps of Engineers, Gulf Region Division reviewed the draft and offered no additional information and had no comments.

Appendix A. Scope and Methodology

We performed this project assessment from late July through mid September 2006 in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included an engineer and an auditor.

In performing this Project Assessment we:

- Reviewed contract documentation to include the following: Contract, Contract Modification P00001, Statement of Work, and minutes for the Pre-Construction Conference and Meeting of Mutual Understanding;
- Reviewed design package (drawings and specifications), Quality Control Plan, and Quality Control and Quality Assurance Reports;
- Interviewed the USACE Resident Engineer and Project Engineer;
- Conducted a limited on-site assessment on 31 July 2006; and,
- Briefed the results of fieldwork with the USACE GRN Commander, Resident Engineer, and Project Engineer before we departed the Mosul Area Office.

Appendix B. Acronyms

BOQ	Bill of Quantities
CQC	Contractor Quality Control
ER	Engineering Regulation
FAR	Federal Acquisition regulations
GRD	Gulf Region Division
GRN	Gulf Region Northern District
IRRF	Iraq Relief and Reconstruction Fund
JCCI	Joint Contracting Command-Iraq
Km	Kilometer
KV	Kilo Volt
LN	Local National
m	meter
m^2	square meters
m^3	cubic meters
mm	millimeters
MOE	Minister of Electricity
PCO	Project and Contracting Office
PE	Project Engineer
QA	Quality Assurance
QAR	Quality Assurance Representative
QC	Quality Control
QM	Quality Management
RE	Resident Engineer
SIGIR	Special Inspector General for Iraq Reconstruction
SOW	Statement of Work
SOP	Standard Operating Procedure
SS	Substation
USACE	United States Army Corps of Engineers

Appendix C. Report Distribution

Department of State

Secretary of State
    Senior Advisor to the Secretary and Coordinator for Iraq
U.S. Ambassador to Iraq
    Director, Iraq Reconstruction Management Office
Inspector General, Department of State

Department of Defense

Secretary of Defense
Deputy Secretary of Defense
    Director, Defense Reconstruction Support Office
Under Secretary of Defense (Comptroller)/Chief Financial Officer
    Deputy Chief Financial Officer
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Department of the Army

Assistant Secretary of the Army for Acquisition, Logistics, and Technology
    Principal Deputy to the Assistant Secretary of the Army for Acquisition, Logistics, and Technology
    Deputy Assistant Secretary of the Army (Policy and Procurement)
Assistant Secretary of the Army for Financial Management and Comptroller
Chief of Engineers and Commander, U.S. Army Corps of Engineers
    Commanding General, Gulf Region Division
Auditor General of the Army

U.S. Central Command

Commanding General, Multi-National Force - Iraq
    Commanding General, Joint Contracting Command – Iraq/Afghanistan
    Commanding General, Multi-National Corps – Iraq
    Commanding General, Multi-National Security Transition Command – Iraq
    Commander, Joint Area Support Group – Central

Other Defense Organizations

Director, Defense Contract Audit Agency

Other Federal Government Organizations

Director, Office of Management and Budget
Comptroller General of the United States
Inspector General, Department of the Treasury
Inspector General, Department of Commerce
Inspector General, Health and Human Services
Inspector General, U.S. Agency for International Development
Mission Director – Iraq, U.S. Agency for International Development

Congressional Committees and Subcommittees, Chairman and Ranking Minority Member

U.S. Senate

Senate Committee on Appropriations
- Subcommittee on Defense
- Subcommittee on State, Foreign Operations and Related Programs

Senate Committee on Armed Services
Senate Committee on Foreign Relations
- Subcommittee on International Operations and Terrorism
- Subcommittee on Near Eastern and South Asian Affairs

Senate Committee on Homeland Security and Governmental Affairs
- Subcommittee on Federal Financial Management, Government Information and International Security
- Subcommittee on Oversight of Government Management, the Federal Workforce, and the District of Columbia

U.S. House of Representatives

House Committee on Appropriations
- Subcommittee on Defense
- Subcommittee on Foreign Operations, Export Financing and Related Programs
- Subcommittee on Science, State, Justice and Commerce and Related Agencies

House Committee on Armed Services
House Committee on Government Reform
- Subcommittee on Management, Finance and Accountability
- Subcommittee on National Security, Emerging Threats and International Relations

House Committee on International Relations
- Subcommittee on Middle East and Central Asia

Appendix D. Project Assessment Team Members

The Office of the Assistant Inspector General for Inspections, Office of the Special Inspector General for Iraq Reconstruction, prepared this report. The principal staff members who contributed to the report were:

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Lloyd Wilson